SIEMENS

POLYMOBIL Plus

SP

Start-up Instructions

From Serial No. 12000

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English
Print No.: SPR8-125.034.02.02.02
Doc. Gen. Date: 03.05
Replaces: SPR8-125.034.02.01.02

Chapter	Page	Revision
All	All	02

Document revision level

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Text emphasis

⚠DANGER	**DANGER indicates when there is an immediate danger that leads to death or serious physical injury.**
⚠WARNING	**WARNING indicates a risk of danger that may lead to death or to serious physical injury.**
⚠CAUTION	**CAUTION used with the safety alert symbol indicates a risk of danger that leads to slight or moderate physical injury and/or damage to property.**
NOTICE	**NOTICE used without the safety alert symbol indicates a risk of danger that if disregarded leads or may lead to a potential situation which may result in an undesirable result or state other than death, physical injury or damage to property.**
NOTE	**NOTE contains information provided with special emphasis to facilitate proper use of the equipment or proper execution of a procedure, i.e. hints, tips.**

Symbols

Checks and adjustments that must be performed with radiation ON are identified by the radiation warning symbol.

This symbol means "Dangerous voltage".

Checks marked with this symbol are to be entered into the test certificate at the end of these instructions.

This symbol means "Attention, consult the documentation".

This symbol indicates components sensitive to Electro-Static Discharge (ESD).

Tools and measurement devices required

NOTE

All tools, measurement and auxiliary devices, with the exception of those marked "* ", are listed in the STC (Service Tools Catalogue) along with their specifications.

- Standard service kit *
- Protective conductor test meter
- Device leakage current meter
- Digital multimeter.

Safety information and protective measures

⚠WARNING

Danger of injuries, death or material damage.

Observe

- the product-specific safety information in these instructions,
- the general safety information in the document TD00-000.860.01... and
- the safety information according to ARTD Part 2.

Non-compliance can lead to death, to injuries or to material damage.

⚠WARNING

X-ray radiation!
Non-compliance can lead to illnesses, irreversible damage to body cells and to the genetic make-up, sever injuries, up to death.

In work on the system in which radiation has to be released, the radiation protection directives and the rules for radiation protection according to ARTD-002.731.02 must be complied with.

Observe the following:

- Use available radiation protection devices.
- Wear radiation protection clothing (lead apron).
- Keep distance from the radiation source as large as possible.
- Release radiation only if necessary.
- Set radiation activity as low as possible. (low KV and mAs values)
- Release radiation as short as necessary.

Checks in which radiation has to be released are identified by the radiation protection warning symbol.

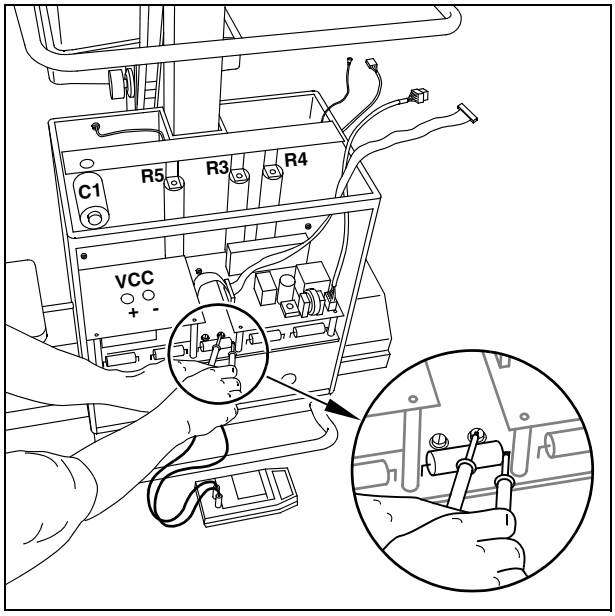

Fig. 1

⚠DANGER

When working with the system open, there is danger of

! Electric shock !

- **The capacitor bank can still be charged.**
  Do not attempt to work on the system while this condition exists.
- **After switching off the system, approximately 450 VDC (350 VDC for Serial-No. < 10100) may still be present in the system; even after disconnecting the line voltage plug. Within 10 minutes this voltage will drop to approximately 10 V.**
- **Always measure the actual voltage present with the DVM at test points -VCC and +VCC on the D960 inverter board or (more accessible) on the D970 capacitor board at the + connection point of capacitor C3 and on the right side of fuse F3 (refer to Fig. 1).**
- **LED's V1 ... V10 on D 970 go out at a significantly higher voltage level and therefore they are not reliable safety indicators.**
- **If a fuse on the D 970 has responded, high voltage may still be present at the affected capacitor even after a prolonged period of time.**
- **The capacitor discharging circuit utilizes the D 925 board and relays CS and LS. If connector X3 or X9 on D 925 or D 950 are not inserted or there is a defect in the circuit, the C-bank will not discharge.**
  This can cause life-threatening voltage to be present in the system even after a prolonged period of time.
- **Refer also to the POLYMOBIL Plus Service instructions RXR8-120.061... "Replacing the capacitor bank".**

- Connect the POLYMOBIL Plus only to a line voltage supply (receptacle) that complies with the requirements of VDE 0107 or corresponds to the local national standards.
- Disconnect the POLYMOBIL Plus at the line voltage **OFF** switch on the operating console and disconnect the **line voltage plug** prior to any service work.
- Remove or insert boards with the generator switched OFF only; observe ESD guidelines when handling boards.

Important start-up information

- After completion of the start-up procedure, the POLYMOBIL Plus which has been completely tested and adjusted at the factory, is ready to operate.
- The POLYMOBIL Plus can be connected to nominal line voltages from 110 V AC through 230 V AC (± 10%) and automatically self-adjusts to the existing power line voltage.

NOTE

- **Adhere to the fuse ratings for the on-site receptacle:**
  - **16A slow-blow (on-site) at 110V ± 10% or 230V ± 10% line voltage.**
- **The line voltage cable of the POLYMOBIL Plus is supplied with a (Schuko) safety plug.**
  Install line voltage plugs that comply with the local standards, if required.

- After start-up, country-specific tests are to be performed, if required; e.g. acceptance test according to RöV (Germany - X-ray ordinance).

Acceptance test according to RöV (Germany):
Required measurements can be partially transferred from the test protocol provided.

The following values are measured at the factory and recorded in the test certificate:

- Light localizer brightness
- Filter values - visual check
- Coincidence of light field and radiation field
- X-ray tube voltage accuracy
- mAs value check
- Reproducibility of the radiation

Information on the protective conductor resistance test

Observe the statements in the safety engineering rules for installation and maintenance (ARTD-002.731.17...).

The protective conductor resistance of 0.2 ohms must not be exceeded.

First measurement

Perform the protective conductor test after completion of all other work.

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD Part 2). In this case the protective conductor resistance to all conductive parts that can be touched must be measured in the normal operating state of the system.

It must be assured that control cables or data cables between the components of the system simulate no protective conductor connection.

During the measurement the power supply cable and additional connection cables with integrated protective conductors must be moved section by section to detect wire breaks.

The protective conductor resistance must not exceed 0.2 ohms.

Record the values as first measured values in the report 'Protective conductor resistance / report' stating the measuring points.

In addition document the measuring method and the measuring instrument used (designation and serial number).

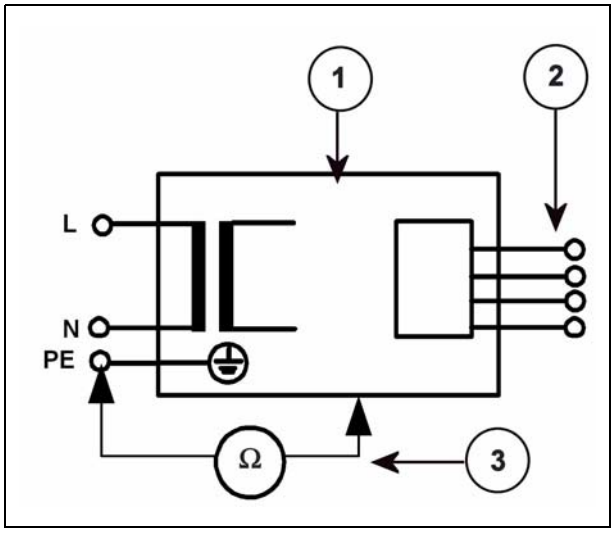

Fig. 2 Measuring circuit for measuring the protective conductor resistance in systems that are separated from the power supply, according to DIN VDE 0751-1:2001-10, Fig. C2.
1 = System
2 = Application part (not available)
3 = Measuring arrangement (integrated in the measuring instrument)

Repeat measurement

In maintenance or repairs perform the protective conductor resistance measurement anew.

Document and assess the values determined in the repeat measurement.

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17...2). In this case the protective conductor resistance to all conductive parts that can be touched must be measured in the normal operating state of the system.

It must be assured that control cables or data cables between the components of the system simulate no protective conductor connection.

During the measurement the power supply cable and additional connection cables with integrated protective conductors must be moved section by section to detect wire breaks.

The protective conductor resistance must not exceed 0.2 ohms.

Record and assess the values determined in the repeat measurement in the report 'Protective conductor resistance / report' stating the measuring points.

In addition document the measuring method and the measuring instrument used (designation and serial number).

NOTE

For the assessment the first measured value and the values documented during previous maintenance or safety checks must be compared with the measured values.
An abrupt rise of the measured values,
even if the limit of 0.2 ohms is not exceeded,
indicates defects in the protective conductor connections (protective conductor or contacting).

Information on the device leakage current measurement

Observe the statement in the safety engineering rules for installation and maintenance (ARTD-002.731.17...).

⚠WARNING

Electrical voltage!
Non-compliance can lead to severe injuries up to death.

The device leakage current measurement may be performed for units of protective class I only after the protective ground wire test has been passed.

First measurement

Perform the device leakage current measurement after completion of all other work.

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17...) and record the determined value as first measured value.

Measurement of the device leakage current according to the differential current method (measuring arrangement according to Fig. 3) should be preferred, since no danger for the measuring person and other persons arises during the measurement.
However, observe the minimum resolution of the leakage current measuring instrument and additional manufacturer's data which restrict the use of the measuring instrument.

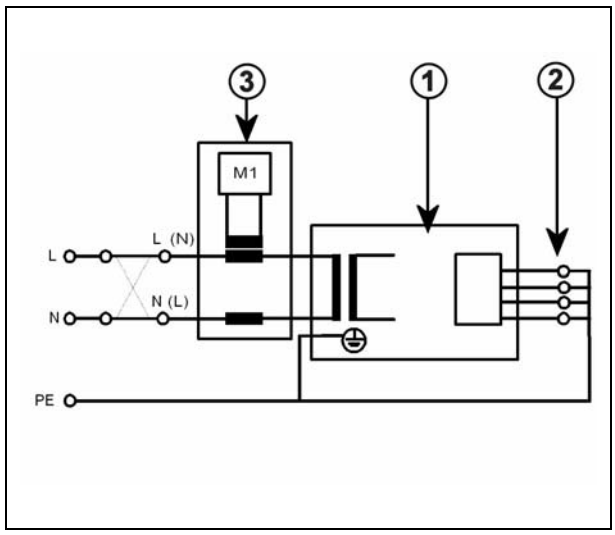

Fig. 3 Measuring circuit for measuring the device leakage current according to the differential current method according to DIN VDE 0751-1:2001-10, Fig. C6 for protective class I.
1 = System
2 = Application part (not available)
3 = Measuring arrangement (integrated in the measuring instrument)

If the direct measurement of the device leakage current is used (measuring arrangement according to Fig. 4), the system must be set up insulated during the measurement and must not be touched during the measurement.

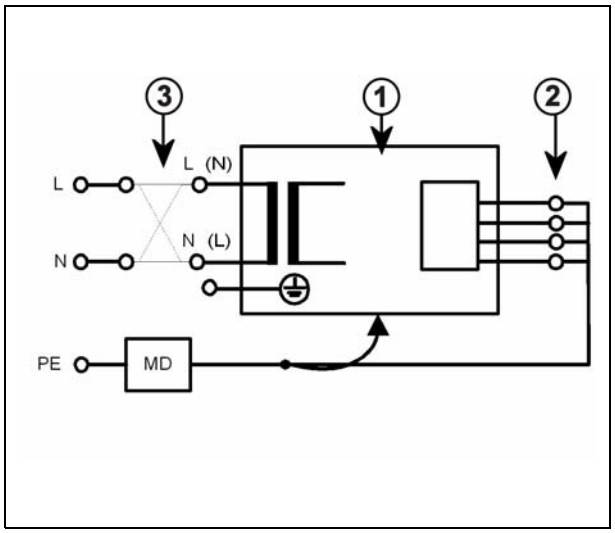

Fig. 4 Measuring circuit for the direct measurement of the device leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class I.
1 = System
2 = Application part (not available)
3 = Measuring arrangement (integrated in the measuring instrument)

⚠WARNING

Electrical voltage!
Non-compliance can lead to severe injuries up to death.
In the direct measurement of the device leakage current (measuring arrangement according to Fig. 4) no housing parts of the system may be touched during the measurement.
Access to the system for third persons must be prevented.

The system must be switched on during the measurement. Measuring instruments with automated measuring sequence must therefore be set to manual measurement.

Enter the highest value as first measured value in the report 'Device leakage current/ report'.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Device leakage current for devices according to the remarks 1 and 3", of 2.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value that corresponds to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring method (differential measurement or direct measurement) and the used measuring equipment (designation and serial number).

Repeat measurement

In the case of maintenance or repairs in the primary circuit of the power supply unit (e.g. repairs to the power-up circuit or replacement of the mains filter), perform the device leakage current measurement anew.

The same measuring conditions as in the first measurement apply.

Document the highest value determined in the repeat measurement in the available report 'Device leakage current/ report' and assess it.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Device leakage current for devices according to the remarks 1 and 3", of 2.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value that corresponds to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring method (differential measurement or direct measurement) and the used measuring equipment (designation and serial number).

NOTE	**For the assessment the first measured value and the values documented during previous maintenance or safety checks must be compared with the measured values.** **An abrupt rise of the measured values, even if the limit of 2.5 mA is not exceeded, indicates defects in the primary circuit of the mains voltage supply (insulation damage, moisture damage, defective interference suppressor, etc.).**

Replacing damaged or missing screws

- As specified in the installation drawings, damaged or missing screws may only be replaced by steel screws conforming to DIN 267 and having the specified tensile strength.

NOTICE	**Replacement of screws.** **All Allen screws must have a tensile strength rating of 8.8.**

Cleaning

- The unit must always be switched off or disconnected before cleaning. Use only water to clean the unit or a lukewarm solution consisting of water and a household cleaning agent.
- Do not use abrasive cleaning agents or organic solvents such as benzine, alcohol or spot remover.
- Do not spray water on the unit.
- For additional information, refer to the Instructions for use, chapter "Cleaning/ Disinfecting".

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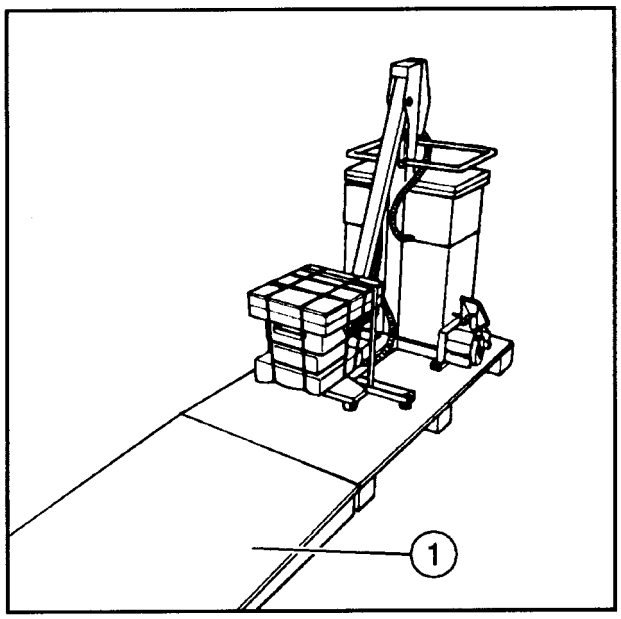


Fig. 1

- Bend the transport brackets on the crate cover upwards and remove the crate cover.
- Bend the transport brackets on the side panels up and remove the side panels.
- Place the side panel with the integrated ramp (1/Fig. 1) down directly in front of the pallet and engage the retaining tabs.
- Remove the plastic cover.

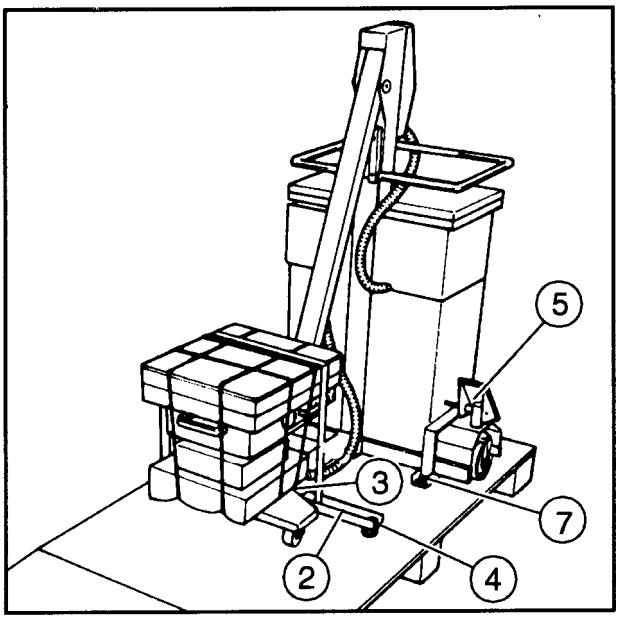


Fig. 2

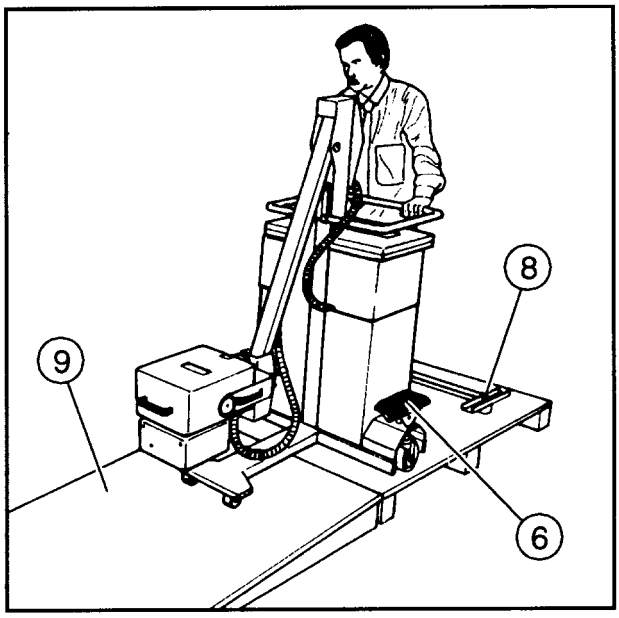


Fig. 3

- Remove the protection covers from the single tank and the collimator.
- Remove the 4 Allen screws (2/Fig. 2, 17 mm spanner opening), the strap (3/Fig. 2) and the U-shaped rail (4/Fig. 2).
- Bring the foot pedal from the locking position into the maneuvering position (6/Fig. 3). For other foot pedal positions, refer to the operating instructions.
- Remove the 2 Allen screws and the bracket (7/Fig. 2, 17 mm spanner opening) from the stand trolley on the right and left side.
- Push the POLYMOBIL Plus over the rail (8/Fig. 3) and move it off the pallet via the ramp (9/Fig. 3).

Checking the nominal line voltage

- Using the DVM, measure the local power line voltage at the receptacle.

NOTE	**The system automatically self-adjusts to the existing power line voltage.**

Attaching the warning label

- Attach the warning label printed in the appropriate language, item number 18 13 554, to the operating console (1/Fig. 1).

NOTE	**The warning label is located in the POLYMOBIL Plus binder.**

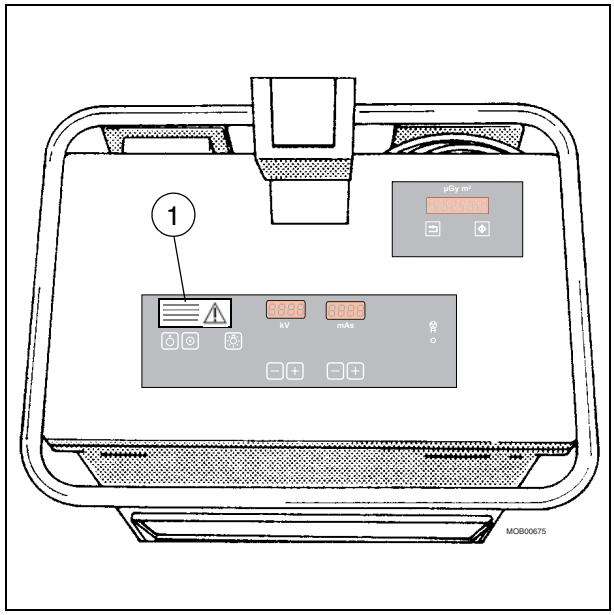


Fig. 1

Checking the controls and indicators

NOTE

If errors occur during the following checks, please refer to the service instructions.

- Connect the line voltage plug to the safety receptacle.
- Press the ON key ⊙ (5/Fig. 5) on the control console.

  ➪ After switching the system on, it executes an initialization routine as follows:

Initialization	– – – kV	– – – mAs	The POLYMOBIL Plus is ready for exposure: the kV display no longer flashes (between - - - and kV value)
Default values acc. to setting	60 kV	10 mAs	

NOTE

If the system has not been used for a period of time, the capacitor leakage current increases. When the system is first switched on, ERR1 may appear, which indicates a high leakage current.
This error will normally disappear, if the system is switched off and on again.
If the error remains, perform the service program "Configuring the capacitor bank" (Pr.1) according to the service instructions.

- Select 50 kV by pressing the -kV key.
- Select all the mAs values by pressing the ± mAs keys from 0.32 . . . 160 mAs (110 V ±10%) or ..... 250 mAs (230 V ±10%).
- Select all the kV values by pressing the ± kV keys from 40 . . . 125 kV.

Check of the DAP measuring system (optional)

- Check the function of the DAP system according to section "Monthly checks" in the Instructions for use.

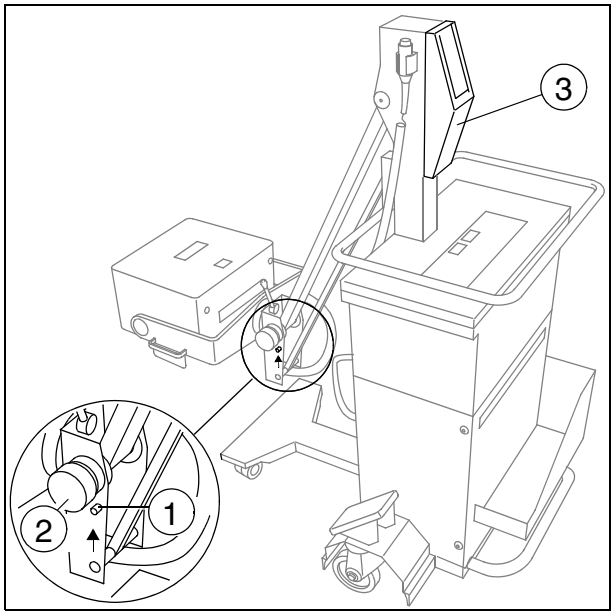


Fig. 2

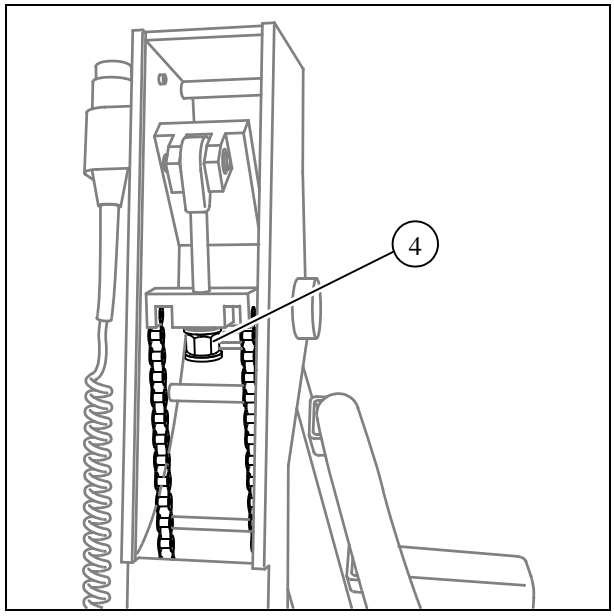


Fig. 3

Checking the counterbalance system

- Unlock the support arm (1/Fig. 2) and loosen the knob (2/Fig. 2). The support arm **without** attached accessories should move through the entire range easily and should stop in any position.

Readjusting the counterbalance system with accessories attached

- If the support arm with accessories attached does not stop in any desired position, readjust the spring tension for the counterbalance.
- Remove the cover (3/Fig. 2) from the stand.
- Release the supplemental brake on the support arm (2/Fig. 2).
- Move the support arm into the horizontal position.
- Tighten the screw (4/Fig. 3) using a 17-mm open-ended wrench. Adjust the spring tension in such a way, that there is a balance when the support arm is in the horizontal position, i.e. that equal force is required to lift and lower the tube assembly.

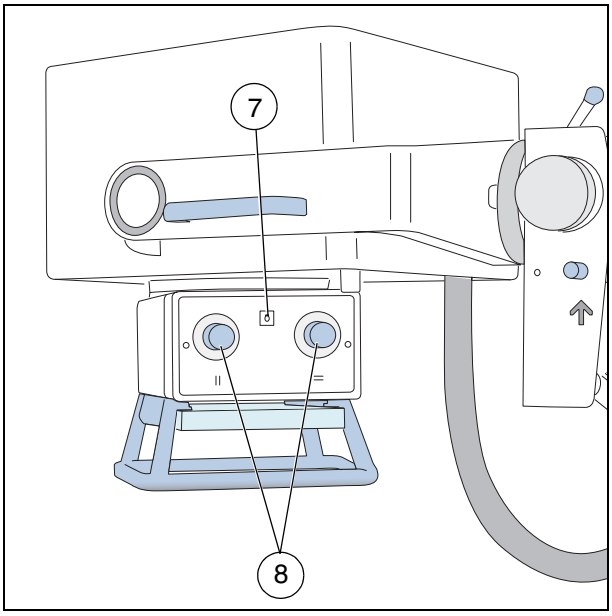


Fig. 4

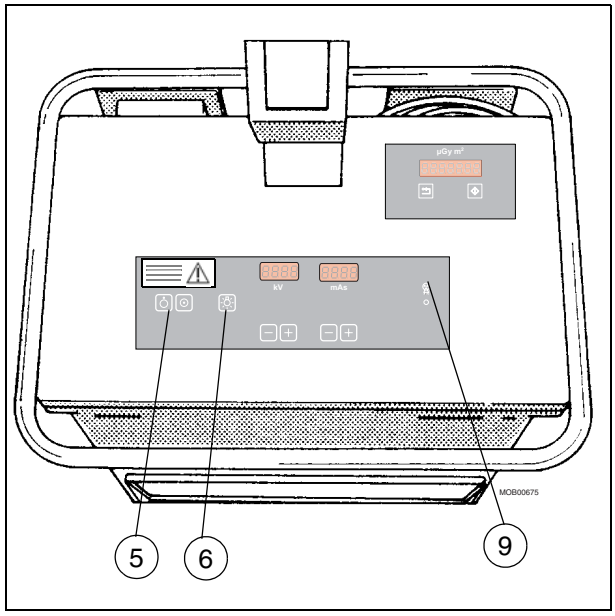


Fig. 5

Checking the controls on the double-slot diaphragm

- Check the light localizer at the control console and at the double-slot diaphragm in each case.
  Press the key (6/Fig. 5 or 7/Fig. 4); the light localizer lamp lights up for 20s ± 1s.
- Check whether the double-slot diaphragm rotates through ± 45× .
- Check the ease and uniformity of the format adjustment (blade pair) by rotating the collimator adjustment knob (8/Fig. 4).

Checking the exposure release with high voltage

- Close the double-slot diaphragm.
  Set 60 kV, 10 mAs.
- Release an exposure.

The radiation indicator (9/Fig. 5) lights during an exposure; at the same time, an acoustic signal sounds.

Checking the exposure control

- Check the exposure control with the following setting:

  60 kV, 125 mAs

- Using a clock, check the acoustic signal for the exposure time.

Proceed as follows:

➪ Release an exposure; the radiation indicator (9/Fig. 5) lights up.

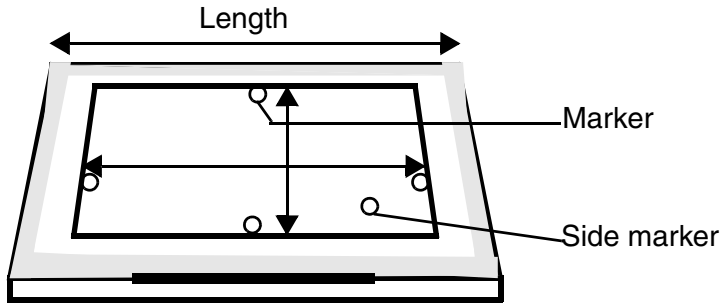
➪ The exposure must switch off after max. 6s.

➪ The radiation indicator goes out, the acoustic signal stops.

Custom programming

- The maximum possible kV and mAs values can be programmed with service program Pr.6 (refer to the service instructions "Service programs").
- The default exposure parameters can be programmed with service program Pr.5 (refer to service instructions "Service programs")

Checking coincidence of light and radiation fields

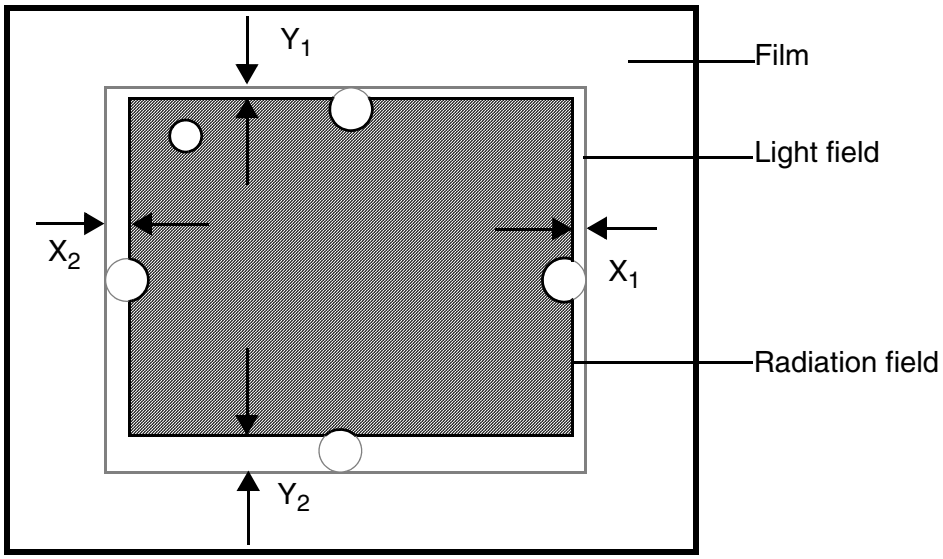


NOTE	**If the POLYMOBIL is equipped with a DAP measuring system; Remove the DAP ionization chamber first.**

- Load a 24 cm x 30 cm or 10”x 12” cassette with film and place it on a table or a similar surface.
- Set the vertical SID to 100 cm or 40” with the measuring tape reaching to the upper edge of the cassette.
- With the control buttons set a format of 18 cm x 24 cm or 8” x 10”.
- Switch on the light localizer and align the cassette.
- Place radiolucent markers (e.g. washers, coins) on the cassette as shown in the sketch. Use one washer as side marking.
- Release an exposure (60 kV, 10 mAs) and develop the film.
- On the developed film, write the following data with a waterproof felt pen:
  - SID setting
  - film size
  - radiation field size

Evaluation:

- Measure the deviations (X1,X2,Y1,Y2) between the edges of the light field and of the radiation field on all four sides, as in the sketch.
- Calculate the sum of the deviations in the X and Y directions (without regard to sign).



- The longitudinal deviation (SY) as well as the width deviation (SX) has to be smaller than 1.6 cm.

NOTE	**In case of deviations greater than 1.6 cm, see Service Instructions Chapter "Checking coincidence of light and radiation fields".**

- Switch **OFF** the POLYMOBIL Plus and disconnect the line voltage cable.

Fig. 1

Protective conductor test

Observe the information on the protective conductor test in these instructions.

- Perform the protective conductor test with the system closed according to ARTD-002.731.17...
  The protective conductor resistance must not exceed 0.2 ohms.
- Record the determined values as first measured values in the report 'Protective conductor resistance / report' (Chapter 6 of these instructions) stating the measuring points.
- In addition document the measuring method and the measuring instrument used (designation and serial number).

Device leakage current measurement

Observe the information on the device leakage current measurement in these instructions.

- Perform the device leakage current measurement with the system closed according to ARTD-002.731.17...
  The limit of 2.5 mA must not be exceeded.

⚠WARNING

Electrical voltage!
Non-compliance can lead to severe injuries up to death.
In the direct measurement of the device leakage current no housing parts of the system may be touched during the measurement.
Access to the system for third persons must be prevented.

- The system must be switched on during the measurement. Measuring instruments with automated measuring sequence must therefore be set to manual measurement.
- Enter the highest value as first measured value in the report 'Device leakage current / report' (Chapter 6 of these instructions).
- This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Device leakage current for devices according to the remarks 1 and 3", of 2.5 mA.
- Transfer the current line voltage from the 'Start-up report' into the report 'Device leakage current / report'. If the current line voltage deviates from the nominal voltage, correct the measured value to the value that corresponds to a measurement at the nominal value of the line voltage.
- Also document the measuring method (differential measurement or direct measurement) and the measuring instrument used (designation and serial number).

Reports

- Separate the fully completed 'Start-up report' (Chapter 5 of these instructions) from these instructions and file it in the system folder "Certificates" register.
- Separate the completed reports 'Protective conductor resistance/ report' and 'Device leakage current/ report' (Chapter 6 of these instructions) from these instructions and file them in the system folder, "Certificates" register.
- Complete the 'Installation Protocol' located on the system and send it to the address stated in the protocol (by FAX).

Final work steps

- Roll up the power line cable on the cable holder in back of the control console.
- Move the support arm (Fig. 1) into the travel position and check the locking mechanism.

POLYMOBIL Plus Start-up report

The Start-up report follows the same format as the start-up instructions.

Item number / Type number / Serial number: . . . . . .

Customer: . . . . . Customer number: . . . . . .

1. Nominal line voltage check ..... V_{AC}

   Measuring inst.Type: . . . . . .
   Serial No.: . . . . . .
   Calibrated up to: . . . . . .

2. Attaching the warning label ☐ ok

3. Check of controls and indicators ☐ ok

4. Check of the DAP measuring system (optional) ☐ ok

5. Check of the counterbalance system ☐ ok

6. Check of controls on the double slot diaphragm ☐ ok

7. Check of exposure release with high voltage ☐ ok

8. Check of exposure control ☐ ok

9. Custom programming
   Maximum possible kV: . . . . . kV
   Maximum possible mAs: . . . . . mAs
   Default exposure parameters: . . . . . kV
   . . . . . mAs

10. Coincidence of light and radiation fields ☐ ok
    Σ X: . . . . . cm
    Σ Y: . . . . . cm

11. Protective conductor measurement ☐ ok
    (measured values in separate report
    'Protective conductor resistance / report')

12. Device leakage current measurement ☐ ok
(Measured values in separate report
'Device leakage current/ report')

Date: . . . . . Service engineer.....

Protective conductor resistance/ report

System: _____

Material number: _____

Serial number: _____

Customer Ident number _____

	Protective conductor resistance					
	First measured value	Repeat measurements measured value				
Measuring point 1: _____						
Measuring point 2: _____						
Measuring point 3 _____						
Measuring point 4 _____						
Measuring point 5 _____						
Measuring point 6 _____						
Measuring point 7 _____						
Measuring point 8 _____						
(*1) Measuring: circuit						
Meas. instrument Type:						
Meas. instrument Ser-No.:						
Meas. instrument calibrated to:						
Assessment:	n.a.					
Date:						
Name:						
Signature						

(*1) Measuring circuit: See Fig. 1, next page

Measuring circuit

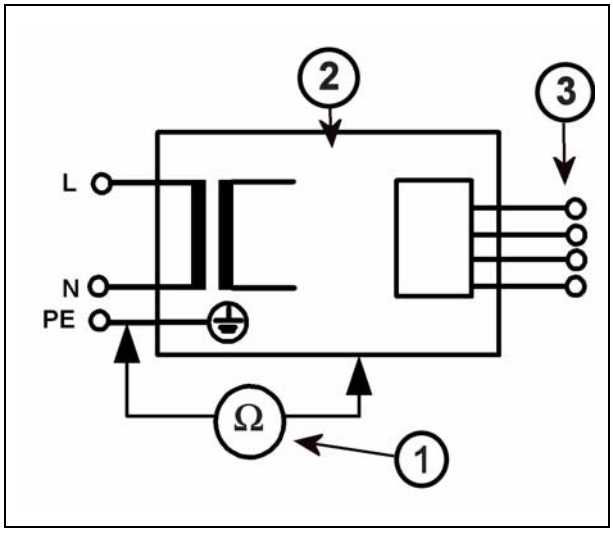


Fig. 1 Measuring circuit for measuring the protective conductor resistance in systems that are separated from the power supply, according to DIN VDE 0751-1:2001-10, Fig. C2.
1 = System
2 = Application part (not available)
3 = Measuring arrangement (integrated in the measuring instrument)

Remarks:

Date	Remark	Name	Signature

Device leakage current/ report

System: _ _ _

Measuring circuit

Direct measurement.

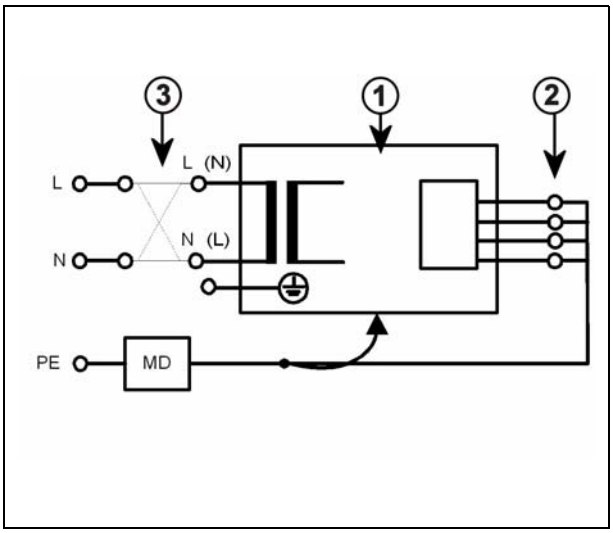


Fig. 2 Measuring circuit for direct measurement of the device leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class I.
1 = System
2 = Application part (if available)
3 = Measuring arrangement (integrated in the measuring instrument)

Differential measurement

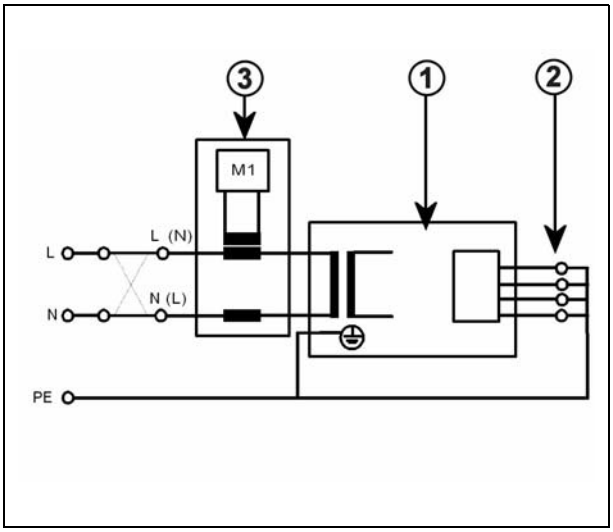


Fig. 3 Measuring circuit for measuring the device leakage current according to the differential current method according toDIN VDE 0751-1:2001-10, Fig. C6 for protective class I.
1 = System
2 = Application part (if available)
3 = Measuring arrangement (integrated in the measuring instrument)

Remarks:

Date	Remark	Name	Signature

Date	Remark	Name	Signature

Changes to previous version 7 - 1

Chapter 0	Cover page, rev. status, contents changed.
Chapter 1 - 3	Editorial changes made.
Chapter 1	’Safety information and protective measures’ section revised. New section ’Information on protective conductor resistance test’ inserted. New section ’Information on device leakage current measurement’ inserted.
Chapter 4	’Protective conductor test’ section changed. ’Device leakage current measurement’ section changed. New ’reports’ section inserted. New ’ Final work steps’ section inserted.
Chapter 5	Start-up report adapted for protective conductor test and device leakage current measurement.
Chapter 6	New ’Electrical safety/ reports’ chapter inserted.

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